**PITHAPUR RAJAH’S GOVERNMENT COLLEGE**

**(AUTONOMOUS)**

**NAAC A GRADE**

***College with Potential for Excellence***

**KAKINADA**

****

**XIX–BOARD OF STUDIES**

DEPARTMENT OF Zoology

**2018-19**

**(CHOICE BASED CREDIT SYSTEM)**

**P.R.GOVT.COLLEGE (AUTONOMOUS) KAKINADA.**

**2018 -19, XIX Board OF STUDIES MEETING. Dt. 04.04.2018**

**Department of Zoology**

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The members present have discussed the syllabi and model question papers (Theory and Practical) related to I to VI semesters in Zoology and made the following Resolutions.

**Resolution I:** Resolved to Continue CBCS System as instructed by Commissioner of Collegiate Education ( CCE ), Amravathi .

**Resolution II:** Resolved to implement 60% external and 40% internal marks for both theory and practicals from the academic year 2018-19 for III and IV semesters along with I and II semesters.

**Resolution III**: Resolved to split 40 marks of theory internal as 20 marks for mid exams and 20 marks for co-curricular activities (seminar/assignment/quiz/group discussion).

**Resolution IV:** Resolved to conduct practical examination also at the end of III and IV semesters along with I and II semesters

**Resolution V:**  Resolved to follow Adikavi Nanayya University zoology

 UG syllabus for III and IV semesters along with I and II semesters

**Resolution VI:** Resolved to follow the same syllabus and exam pattern for the

 final year students (2018-19)

**Resolution VII:** Resolved to continue two subject electives (Advanced electives) in

the VI semester-Biomolecules, Endocrinology &Animal

 Biotechnology and Bioinformatics.

**Resolution VIII:** Resolved to continue cluster papers- (-1-fisheries and aquaculture

and -2 Clinical Science, along with project for final year students at

 the end of VI semester)

**Resolution IX:** Resolved to introduce a new cluster paper in VI semester with

Paper-1-Clinical biochemistry, Paper-2 Hematology and Paper III –

 Clinical Microbiology.

**Resolution x:** Resolved to follow the general stream zoology syllabus for B.Voc

 (Commercial aquaculture) I and II year students.

**Resolution xI :** Resolved to continue the same paper setters and examiners for all

the semesters.

**Resolution XII:** Resolved to include Blue Prints for model question papers for

all      semesters.

**Chairperson**

**Board of Studies**

**Dept. of Zoology**

**P.R. GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA**

**DEPARTMENT OF ZOOLOGY**

XIX-BOARD OF STUDIES MEETING 2018-19

CHOICE BASED CREDIT SYSTEM

(WITH EFFECTIVE FROM 2018-19)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **S. No.**  | **Semester No.** | **Domain Specific course/Clusters** | **Title** | **Page no** |
| 1 | I | General Core | **Animal diversity I**  | **08** |
| 2 | II | General Core |  **Animal diversity II** | 14 |
| 3 | III | General Core | **Cytology ,genetics and evolution** | **20** |
| 4 | IV | General Core | **Embryology, Physiology and Ecology** | **26** |
| 5 | V | General core  | **Animal Physiology** | **32** |
| 6 | V | General Core | **Conservation Biology** | **37** |
| 8 | VI | Elective I | **Biomolecules, endocrinology****And animal biotechnology** | **43** |
|  |  | Elective II | **Bioinformatics** | **47** |
| 9 |  | Cluster Elective A1 | **Fisheries and aquaculture** | **53** |
| Cluster Elective A2 | **Clinical science** | **59** |
| Cluster Elective A3 | **Projectwork** | **62** |
| 10 |  | Cluster Elective B1 | Clinical Biotechnology | **63** |
| Cluster Elective B2 | **Haematology** | **65** |
| Cluster Elective B3 | **Project work/Microbiology** | **67** |

**P.R. GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA**

**DEPARTMENT OF ZOOLOGY**

XIX-BOARD OF STUDIES MEETING 2018-19

CHOICE BASED CREDIT SYSTEM

(WITH EFFECTIVE FROM 2018-19)

**--------------------------------------------------------------------------------------------**

**Time: 02.00 PM. Date: 04.04.2018**

**Venue: *Department of Zoology***

The XIX BOARD OF STUDIES Meeting of the Department of Zoology took place 02:OO PM on O4.04.2018 in the Department of Zoology P.R. Govt. College, (A) Kakinada for the year 2018-19. The following members attended.

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl No** |  **Name and affiliation** | **Designation** | **Signature**  |
| 01 | Sri.B.Ahmad Ali Baba Lecturer in-chargeDept of ZoologyP R College(Autonomous)KAKINADA. | Chairperson |  |
| 02 | Dr.P. Vijaya Nirmala Prof. in Zoology Dept. of ZoologyAdikavi Nannaya UniversityRAJAHMAHENDRAVARM | Vice-Chancellor’s Nominee  |  |
| 03 | Dr.D.Padmavathi Senior Lecturer in Zoology M.S.N. Degree College KAKINADA | Subject Expert  |  |
| 04 | Dr. A.SreenivasuluDirectorV.S.Lakshmi Research Centre | Industralist |  |
| 05 | Dr.M. Vijaya SanthiLecturer in ZoologyIDEAL CollegeKAKINADA | Subject Expert |  |

 **DEPARTMENTAL STAFF**

6. Dr.N.Sreenivas Member

 Lecturer in Zoology

 P.R.Govt College (A)

 Kakinada.

7.P.John Kiran Member

 Lecturer in Zoology

 P.R.Govt College (A)

 Kakinada.

8. T Venkateswara Rao Member

 Lecturer in Zoology (Contract)

 P.R.Govt College (A)

 Kakinada.

9.Sk. Madina Saheb Member

 Lecturer in Zoology (Contract)

 P.R.Govt College (A)

 Kakinada

 10. P.Vijaya Chandrika Member

 Lecturer in Zoology (Guest)

 P.R.Govt College (A)

 Kakinada

11. Y. Gouthami Member

 Lecturer in Zoology (Guest)

 P.R.Govt College (A)

 Kakinada

12. V. Praveena Member

 Lecturer in Zoology (Guest)

 P.R.Govt College (A)

 Kakinada

**LIST OF EXAMINERS**

**DEPARTMENT OF ZOOLOGY**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No**  | **Name of the Examiners**  |  **Subject**  |  **Name of the College**  |
| 01 | Dr.K.Bala Jagannadha Rao  | Zoology  | AMAL College, Anakapally  |
| 02 | Dr.M. vijaya santhi | Zoology | Ideal college ,kakinada |
| 03 | B.Vijaya Bhaskara Rao  | Zoology  | AVN College, Vizag  |
| 04 | Dr.M.Vijaya Kumar  | Zoology  | GDC (Men), Palakollu  |
| 05 | Dr. P.Jaya  | Zoology  | VSK College, Vizag  |
| 06 | K.Visweswara Rao  | Zoology  | C.R.R.College (Men) Eluru |
| 07 | P.Ramakrishna Prasad  | Zoology  | C.R.R.College (Men) Eluru  |
| 08 | K.K.D.M.Lakshmi  | Zoology  | C.R.R.College (Womens) Eluru  |
| 09 | Dr.K.Usha Rani  | Zoology  | D.N.R.College, Bhimavaram  |
| 10 | Smt.D.Parvathi  | Zoology  | G.D.College, Ganapavaram  |
| 11 | N.Suneetha  | Zoology  | GDC ,Nidadavolu  |
| 12 | C.Vara Lakshmi  | Zoology  | M.R.College (W) Vizianagaram  |
| 13 | M.Rajeswari  | Zoology  | M.R.College (W) Vizianagaram  |
| 14 | B.Narayana Rao  | Zoology  | M.R.College (A) Vizianagaram  |
| 15 | G.Mani  | Zoology  | M.R.College (A) Vizianagaram  |
| 16 | R.Indira  | Zoology  | St.Theressa College, Eluru  |
| 17 | V.Surya Kumari | Zoology  | M.R.College (A) Vizianagaram  |
| 18 | R.Prabakara Rao  | Zoology  | M.R.College, Peddapuram  |
| 19 | Dr.V. Sandhya  | Zoology  | GDC, Ganapavaram  |
| 20 | PVBKRL.Saibaba  | Zoology  | SKBR.College, Amalapuram  |
| 21 | V.V.Padmavathi  | Zoology  | St.Theressa College, Eluru  |
| 22 | Dr. P. Padmavathi  | Zoology  | MSN Degree College, Kakinada  |

**Lecturer in charge- Dept of Zoology**

***LIST OF QUESTION PAPER SETTERS***

**DEPARTMENT OF ZOOLOGY**

|  |  |  |  |
| --- | --- | --- | --- |
| **S.N** | **Name of the Examiners**  | **Subject**  | **Name of the College**  |
| 01  | Dr.K.V.C.S.Appa Rao  | Zoology  | Y.N.College, Narasapuram  |
| 02  | Y.V.K.Durgaprasad  | Zoology  | V.S.K. College , Vizag  |
| 03  | Dr.k.Narasimha murthy | Zoology  | Pydah fisheries polytechnic college Patavala |
| 04  | Dr.K.Usha Rani  | Zoology  | D.N .R. College, Bhimavaram  |
| 05  | Mrs, R.Krishna Bharathi  | Zoology  | S.K.V.T.College, Rajahmundry.  |
| 06  | A.Venkatapathi Raju  | Zoology  | S.K.B.R.College, Amalapuram.  |
| 07  | Dr. Rama Murthy  | Zoology  | B.V.K.College, Vizag.  |
| 08  | K.Sathi Reddy  | Zoology  | Bullayya College, Vizag.  |
| 09  | K. Chakravarthy  | Zoology | DRG Govt. Degree College, Tp.gudem |
| 10  | Y.Polinaidu  | Zoology  | C.R.R.College (A) Eluru  |
| 11  | K.V.S. Reddy  | Zoology  | A.N.R. College, Gudivada  |
| 12  | Dr.V.Surya Kumari  | Zoology  | M.R.College, Vijayanagaram  |
| 13 | Dr. K.S.R.Prasada Rao | Zoology  | S.N.K.P.& Dr.K.S.Raju College Penugonda  |
| 14  | Smt.M.Vasanthalakshmi  | Zoology  | D.R.G.Govt Degree College, Tp.gudem.  |
| 15  | Dr. P.Jaya  | Zoology  | VSK College, Vizag  |
| 16  | Dr.M.Vijaya Kumar  | Zoology  | GDC (Men), Palakollu  |
| 17  | N.Suneetha  | Zoology  | GDC ,Nidadavolu  |

 **Lecturer in charge-Dept of Zoology**

**BOS-ZOOLOGY-2018-19**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**I B.Sc., (BZC), SEMESTER-I**

(WITH EFFECTIVE FROM 2017-2018)

**TITLE: ANIMAL DIVERSITY I (PROTOZOA TO HEMICHORDATA)**

**Course Code: ZO 1208**

**Hrs:4 Credits: 3**

|  |  |
| --- | --- |
| **OBJECTIVES** | **LEARNING OUTCOMES** |
| 1) To instill knowledge across different  areas of animal science. 2) Provides an opportunity to familiarize  with the life cycles and mode of  reproduction in different animal groups. 3) To understand the systemic and functional  morphology of various groups of  invertebrates. 4) To study their economic importance, affinities and adaptations. | 1) At the end of the course, students should  be able to appreciate the complexities of  biological organisation and be able to  address scientifically the issues of animaldiversity in a rational way.2) Students will have the knowledge and skills to: Describe the variety of invertebrate organisms and explain their evolutionary origin and diversification.3) Investigate invertebrates in laboratoryand field conditions, and identify majortaxonomic groups.4) Understand the requirements for collection and short-term maintenance of invertebrate species for photographic and scientific observation.5) Understand and communicate themajorevolutionary innovations ininvertebrate  groups, and describe the functional significance of associated morphologies and behaviours. |

**MODULE-I (PROTOZOA & PORIFERA) 15 Hrs**

* 1. *General Characters and classification of Protozoa and Porifera upto classes*
	2. ***Paramecium:*** Structure, Locomotion and Reproduction (Binary Fission, Conjugation
	3. ***Sycon*:** External features, Skeleton,
	4. Canal system in Sponges

**MODULE-II (CNIDARIA, PLATYHELMINTHES &NEMATODA) 15Hrs**

2.1*. General Characters and classification of Coelenterata, Platyhelminthes and Nematodaupto classes*

2.2**. Obelia:**Structure of Polyp and Medusa.

2.3. Polymorphism in Coelenterates; Corals and Coral reef formation.

2.4**. Fasciola *hepatica*:** Structure and life History only

**MODULE-III (ANNELIDA, ARTHROPODA &ONYCHOPHORA) 15Hrs**

3.1*. General Characters and classification of Annelida, Arthropoda upto classes*

3.2***. Hirudinaria*:** External features, digestive, excretory and reproductive systems

3.3***. Palaemon*:** External morphology, appendages, respiratorysystem.

3.4*Peripatus*- Affinities and Significance

**MODULE-IV (MOLLUSCA, ECHINODERMATA AND HEMICHORDATA)15 Hrs**

4.1*. General Characters and classification of Mollusca and Echinodermataupto classes*

4.2. Pearl formationin Pelecypoda, Torsion in Gastropods

4.3. Water vascular system in Star Fish***Balanoglossus:*** Structure and affinities.

4.4. Non Chordate Larval Forms

Trochophore

Nauplius

Bipinnaria

Tornaria

**REFERENCES**

1. EkambaranathaAyyar.M. and T.N. Ananthakrishnan, 1992. Manual of Zoology Vol. [Invertebrata], parts I and II.S. Viswanathan (Printers and Publishers) Pvt. Ltd; Madras.

2. Jordan, E.L. and P.S. Verma, 1993. Ivertebrate Zoology, 12th Edition. S. Chand and Co.     Ltd, New Delhi.

3. Kotpal, R.L. 1988 - 1992 Protozoa, Porifera, Coelenterata, Helminthes, Arthropoda,     Mollusca, Echinodermata. Rastogi Publications, Meerut.

4. Parker and Haswell, 1964. Text Book of Zoolgy. Vol I (Invertebrata). A.Z.T; B.S.     Publishers and distributors, New Delhi.

5. L.A. Borradile and F.A. Pott. The Invertebrates. Cambridge University press.UK

6. Invertebrate Zoology – B.Sc, I Year,Telugu Academy

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**I B.Sc., (BZC), SEMESTER-I**

**TITLE: ANIMAL DIVERSITY I (PROTOZOA TO HEMICHORDATA)**

(WITH EFFECTIVE FROM 2017-2018)

**COURSE CODE: ZO 1208**

**MODEL QUESTION PAPER**

**Time: 2 ½ hrs. Max Marks: 60**

**PART – 1**

**Note:Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessary 3x10 = 30M**

**SECTION- A**

1. Explain conjugation in Paramecium with neat diagrams. Add a note on significance of conjugation.
2. Write an essay on Coral reef formation
3. Write an account of life history of Liver Fluke.

**SECTION- B**

1. Write an essay on the affinities of *Peripatus* and its significance.
2. Describe the pearl formation in Pelicypoda.
3. Describe the water vascular system in *Starfish.*

**Part – II**

 Answer any **Six** question **6x5=30M**

1. Binary fission
2. Leucon type of Canal System.
3. Outline classification of Phylum Protozoa
4. Polymorphism in Hydrozoa
5. Botryoidal Tissue
6. *Cephalic Appendages of palaemon*
7. Antennary glands
8. Affinities of Balanoglossus.
9. Nauplius larva
10. Shortnotes on Torsion

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**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**I B.Sc., (BZC), SEMESTER-I**

**ANIMAL DIVERSITY-I**

**BLUE PRINT FOR QUESTION PAPER SETTER**

**Max Marks: 60**

**Time: 2 ½ hrs**

|  |  |  |  |
| --- | --- | --- | --- |
| **MODULE NO. & NAME** | **ESSAY QUESTIONS****10 MARKS** | **SHORT ANSWER QUESTIONS****5 MARKS** | **MARKS ALLOTED TO THE UNIT** |
| **MODULE – I**(Protozoa & Porifera) | 01 | 03 | 25 |
| **MODULE – II**(Cnidaria, Platyhelminthes & Nematoda) | 02 | 02 | 30 |
| **MODULE – III**(Annelida, Arthropoda &Onychophora) | 01 | 02 | 25 |
| **MODULE – IV** (Mollusca, Echinodermata &Hemichordata) | 02 | 03 | 30 |
| **Total No.of Questions** | **06****Of which 3 to be answered** | **10****Of which 6 to be answered** | **110****Marks including choice.** **Of which 60 Marks to be answered** |

 **NOTE:**

**The question paper setters are requested to kindly adhere to the format given inthe above table.**

**I B.Sc., (BZC), SEMESTER-I**

**ANIMAL DIVERSITY-I**

**PRACTICAL SYLLABUS (with effective from 2017-18)**

**I. DISSECTIONS-Only Demonstration**

a) Mounting of Cephalothoracic and abdominal appendages of Prawn

 b) Nervous system of Prawn

**II. OBSERVATION OF THE FOLLOWING SLIDES / SPECIMENS / MODELS:**

 1. Protozoa - *Elphidium*. *Paramoecium*– binary fission and Conjugation.

 2. Porifera - *Spongilla, Euspongia*.

 3. Coelenterata - *Physalia, Aurelia, , Obelia colony, Corallium, Gorgonia,*

 4. Platyhelminthes and Nemathelminthes–Ascaris-male & female, *Larval stages of   FasciolaMiracidium, Redia, Cercaria, Ancylostoma duodenale.*

 5. Annelida - *Nereis*, *Hirudinaria, Trochophore* larva*.*

 6. Arthropoda -*Sacculina, Limulus, Julus, Scolopendra, Peripatus.*

 7*.* Mollusca - *Chiton, Unio, Sepia, Octopus, Glochidium larva*.

 8. Echinodermata - *Ophiothrix, Echinus,Cucumaria, Antedon*, *Bipinnaria*larva.

 9. Hemichordata – *Balanoglossus*, *Tornaria*larva.

**I B.Sc., (BZC), SEMESTER-I**

**ANIMAL DIVERSITY-I**

**PRACTICAL MODEL PAPER**

**(AT THE END OF I-SEMESTER-EFFECTIVE FROM 2017-18)**

**Max marks: 50**

**Time : 2Hrs**

1. Dissect and display the nervous system of Palaemon. Draw a neat labelled diagram 10M

2. Identification of spotters 4X5=20M

A)--------------------

B)--------------------

C)--------------------

D)--------------------

E)--------------------

3. Record 05M

4. Continuous Internal Assessment 15M

Total **50M**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**I B.Sc., (BZC), SEMESTER-II**

(WITH EFFECTIVE FROM 2017-2018)

**TITLE: ANIMAL DIVERSITY II (PROTOCHORDATA TO MAMMALIA)**

**Course Code: ZO 2208**

Hrs: 4 Credits: 3

|  |  |
| --- | --- |
| **OBJECTIVES** | **LEARNING OUTCOMES** |
| 1) To instill knowledge across different  areas of animal science. 2) Provides an opportunity to familiarize  with the life cycles and mode of  reproduction in different animal groups. 3) To understand the systemic and functional  morphology of various groups of  Chordates. 4) To study their economic importance, affinities and adaptations. | 1) At the end of the course, students should be able to appreciate the complexities of biological organisation and be able to address scientifically the issues of animal diversity in a rational way. 2) Students will have the knowledge and skills to: Describe the variety of invertebrate organisms and explain their evolutionary origin and diversification.3) Investigate invertebrates in laboratory and field conditions, and identify major taxonomic groups.4) Understand the requirements for collection and short-term maintenance of invertebrate species for photographic and scientific observation.5) Understand and communicate the major evolutionary innovations in invertebrate groups, and describe the functional significance of associated morphologies and behaviours. |

**MODULE-I (CEPHALOCHORDATA, UROCHORDATA &PISCES)            18Hrs**

* 1. Characters and Classificatin of Fishes upto sub class level, Salient features of Cephalochordata
	2. Structure and life-history of *Herdmania*, Significance of retrogressive Metamorphosis.
	3. *Scoliodon*: Morphology, Circulatory system, nervous system and sense organs.
	4. Migration in fishes and types of scales

**MODULE-II (AMPHIBIA) 12Hrs**

*2.1. Characters and Classification of Amphibia upto orders*

*2.2. Rana* : Morphology, respiratory system, structure of heart and reproductive systems only.

2.3. Parental care in amphibians

**MODULE-III (REPTILIA)**  **12Hrs**

3.1. *Characters and Classification of Repteliaupto orders*

*3.2. Calotes*: Morphology, digestive system, urinogenital system and nervous systems.

3.3. Identificatin of Poisonous snakes

**MODULE-IV (AVES & MAMMALS) 18Hrs**

4.1. General characters of Aves and Mammals.

4.2. Pigeon (*Columbia livia*) : Exoskeleton, respiratory system, structure of heart,

4.3. Migration in birds and its significance, Flight adaptation in birds

4.4. Dentition in Mammals, Prototheria, Metatheria and Eutheria

**References**

* J.Z. Young, 2006. The life of vertebrates. (The Oxford University Press, New Delhi). 646 pages. Reprinted
* Arumugam, N. Chordate Zoology, Vol. 2. SarasPlublication. 278 pages. 200 figs.
* A.J. Marshall, 1995. Textbook of zoology, Vertebrates. (The McMillan Press Ltd., UK). 852 pages. (Revised edition of Parker & Haswell, 1961).
* M. EkambaranathaAyyar, 1973. A manual of zoology. Part II. (S. Viswanathan Pvt. Ltd., Madras).
* P.S. Dhami& J.K. Dhami, 1981. Chordate zoology. (R. Chand & Co.). 550 pages.
* Gurdarshan Singh & H. Bhaskar, 2002. Advanced Chordate Zoology. Campus Books, 6 Vols., 1573 pp., tables, figs.
* A.K. Sinha, S. Adhikari & B.B. Ganguly, 1978. Biology of animals. Vol. II. Chordates. (New Central Book Agency, Calcutta). 560 pages.
* R.L.Kotpal, 2000. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut). 632 pages.
* E.L. Jordan & P.S. Verma, 1998. Chordate zoology. (S. Chand & Co.). 1092 pages.
* G.S. Sandhu, 2005. Objective Chordate Zoology. Campus Books, vii, 169 pp.
* Sandhu, G.S. & H. Bhaskar, H. 2004. Textbook of Chordate Zoology. Campus Books, 2 vols., xx, 964 p., figs.
* Veena, 2008. Lower Chordata. (Sonali Publ.), 374 p., tables, 117 figs.

**SEMESTER-II**

**TITLE: ANIMAL DIVERSITY II (PROTOCHORDATA TO MAMMALIA)**

**Course Code: ZO 2208**

**MODEL QUESTION PAPER**

**Time: 2 ½ hrs. Max Marks: 60**

**PART – 1**

**Note :Answer any THREE questions choosing at least one question from  each section.**

**Draw the diagrams where ever necessary 3 X10 = 30**

**SECTION- A**

1. what is retrogressive metamorphosis? Discuss with special reference to the life history of an

Ascidian and write its significance

2. Explain migration in fishes

3. Write an essay on parental care in Amphibia

**SECTION-B**

4. Explain the urinogenital system of Calotes with a neat labelled diagram

5. Explain the various flight adaptations in birds

6. Write an essay on Dentition in mammals

**Part – II**

 Answer any **Six** questions **6x5=30**

7. Scales in Fishes

8. General Characters of Fishes

9. Sense organs of Scoliodon

10. Buccopharyngeal respiration

11. Structure of heart of Frog

12.Brain in Calotes

13.Digestive glands of Calotes

14. Quill feather

15. Short notes on Migration of birds

16. Prototheria

**I B.Sc., ZOOLOGY, II Semester (W.E.F. 2017-18)**

**PAPER II –ANIMAL DIVERSITYII (PROTOCHORDATA TO MAMMALIA)**

**BLUE PRINT FOR QUESTION PAPER SETTER**

**Time: 2 ½ hours**

**Max marks: 60**

|  |  |  |  |
| --- | --- | --- | --- |
| **MODULE NO. & NAME** | **ESSAY QUESTIONS****10 MARKS** | **SHORT ANSWER QUESTIONS****5 MARKS** | **MARKS ALLOTED TO THE UNIT** |
| **MODULE – I**(Urochordata& Pisces) | 02 | 03 | 35 |
| **MODULE – II**(Amphibia) | 01 | 02 | 20 |
| **MODULE – III**(Reptilia) | 01 | 02 | 20 |
| **MODULE – IV** (Aves & Mammalia) | 02 | 03 | 35 |
| **Total No.of Questions** | **06****Of which 3 to be answered** | **10****Of which 6 to be answered** | **110 Marks including choice.****Of which 60 Marks to be answered** |

**NOTE:The question paper setters are requested to kindly adhere to the format givenin the above table.**

**I B.Sc., ZOOLOGY, II Semester (W.E.F. 2017-18)**

**PAPER II –ANIMAL DIVERSITY II (PROTOCHORDATA TO MAMMALIA**

**PRACTICAL SYLLABUS**

**I. Dissections**-Scoliodon III, VII, IX and X Cranial nerves (Only Demonstration

 -Mounting of Placoid scales of Scoliodon

**III Identification of slides/spotters**

1. Protochordata :*Herdmania, Amphioxus, Amphioxus* T.S through pharynx.
2. Cyclostomata :*Petromyzon and Myxine.*
3. Pisces : *Pristis, Torpedo, Hippocoampus ,Exocoetus, Echeneis, Labeo, Catla, Clarius,Channa, Anguilla*.
4. Amphibia :*Ichthyophis, Amblystoma, Axolotl larva, Hyla,*
5. Reptilia: *Draco, Chamaeleon, Uromastix, , Testudo, Trionyx, Russels viper, Naja,* Krait, *Hydrophis, Crocodile.*
6. Aves : *Psittacula, Eudynamis, Bubo, Alcedo.*

7.Mammalia: *Ornithorhynchus*,*Pteropus,Funambulus.*

**I B.Sc., ZOOLOGY, II Semester (W.E.F. 2017-18)**

**PAPER II –ANIMAL DIVERSITY II (PROTOCHORDATA TO MAMMALIA**

**PRACTICAL MODEL PAPER**

**(AT THE END OF II-SEMESTER-EFFECTIVE FROM 2017-18)**

**Max marks: 50**

**Time : 2Hrs**

1. Dissect and display the III & VII cranial nerves of Scoliodon. Draw a neat labelled diagram 10M

2. Identification of 5 spotters 4 X5=20M

A)--------------------

B)--------------------

C)--------------------

D)--------------------

E)--------------------

3. Record 05M

4. Internal Assessment 15M

**Total 50M**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**II B.Sc., (BZC), SEMESTER-III**

**ZOOLOGY SYLLABUS**

(WITH EFFECTIVE FROM 2018-19)

**AT THE END OF SEMESTER-III**

**Title: CYTOLOGY, GENETICS AND EVOLUTION**

**Hours: 4 Credits 3**

|  |  |
| --- | --- |
| **OBJECTIVES** | **LEARNING OUTCOMES** |
| 1. To learn the cytological techniques, the     structure and functions of various cellular     components. 2. To understand the central dogma of     Protein synthesis including DNA     replication, transcription & Translation 3. To understand the various human     chromosomal disorders4. To understand the various evolutionary     theories and the different types of animal     behaviours | 11. At the end of the course, students should     be able to understand the structure and    function of various animal cell organelles2. Will appreciate the central dogma of      protein synthesis3. Will understand the genetic basis of human       Chromosomal disorders which forms the      basis of gene therapy4. Will appreciate the scientific basis of     Organic evolution and the various     behaviour patterns of animals |

**Module - I**

Cytology 1

1.1 Definition, history, prokaryotic and eukaryotic cells, virus

1.2 Structure of eukaryotic cell.

1.3 Structure of Plasma membrane –Different models

**Module - II**

Cytology 2

2.1. Structure and Functions of Endoplasmic reticulum, Golgi Apparatus

2.2. Structure and functions of, Lysosomes, Ribosomes,

2.3. Structure and functions of Mitochondria.

* 1. Chromosomes structure, types and functions

**Module - III**

Genetics

3.1 Mendel’s Laws of Inheritance

3.2 Incomplete dominance, codominance, Epistasis, Pleotropy

3.3 Sex determination, Sex linked inheritance

3.4 Linkage and crossing over

**Module - III**

Evolution

4.1. Origin of Life

4.2. Lamarckism, Darwinism, Neo Darwinism, Hardy Weinberg Equilibrium

4.3. Types of Natural Selection (Directional, Stabilizing, Disruptive)

4.4. Speciation (Allopatric and Sympatric), Isolation-Isolating Mechanisms

**REFERENCES**

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12. V.B. Rastogi, 2003. Organic evolution. (Kedar Nath Ram Nath). 482 pages.

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**II B.Sc., (BZC), SEMESTER-III**

**ZOOLOGY SYLLABUS**

(WITH EFFECTIVE FROM 2018-19)

**AT THE END OF SEMESTER-III**

Blue print for **CYTOLOGY, GENETICS AND EVOLUTION**

|  |  |  |  |
| --- | --- | --- | --- |
| **Module Name**  | **PART I** **Essay Type Questions****10 marks each** | **Part II Short Answer Questions****5 marks each** | **Marks Allotted to the Chapter**  |
| 1. **Cytology 1**
 | **2** | **01** | **25** |
| 1. **Cytology 2**
 | **1** | **03** | **25** |
| 1. **Genetics**
 | **1** | **03** | **25** |
| 1. **Evolution**
 | **2** | **03** | **35** |
| 1. **Total**
 | **06****Of which 3 to be answered** | **10****Of which 6 to be answered** | **110 Marks including choice.** **Of which 60 Marks to be answered**  |

**NOTE: The question paper setters are requested to kindly adhere to the format given in the above table.**

**II B.Sc., (BZC), SEMESTER-III**

**TITLE: CYTOLOGY, GENETICS AND EVOLUTION**

**Course Code:**

**MODEL QUESTION PAPER**

**Time: 2 ½ hrs. Max Marks: 60**

**PART – 1**

**Note :Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessary 3 X10 = 30**

**SECTION- A**

1. Explain the Structure of Eukaryotic Cell with diagram

2. Write an essay on structure of plasma membrane and add a note on different models

3. Describe the structure and functions of Endoplasmic Reticulum

**SECTION-B**

4. Explain the Law of independent assortment with suitable example

5. Explain Sex Determination in Animal kingdom

6. Write an essay on Speciation

**Part – II**

 Answer any **Six** questions **6x5=30**

7. Prokaryotic cell

8. Lysosomes

9. Golgi apparatus

10. Structure of Chromosome and its functions

11. Incomeplete Dominance

12. Epistasis

13. Crossing over

14. Hardy Weinberg Equilibrium

15. Natural Selection

16. Neo Darwinism

**II B.Sc., (BZC), SEMESTER-III**

**ZOOLOGY PRACTICAL SYLLABUS**

**ZOOLOGY - PAPER – III (At the End of III semester)**

**CYTOLOGY, GENETICS AND EVOLUTION**

**Max marks: 50**

**Time : 2Hrs**

**Cytology**

1.Preparation of temporary slides of Mitotic divisions with onion root tips

1. Observation of various stages of Mitosis with prepared slides
2. Prophase b. Metaphase c. Anaphase d. Telophase

**Genetics**

1. Study of Mendelian inheritance using suitable examples/Problems (Any four Problems)
2. Human Karyotype Diagram

**Evolution**

1. Study of Homologous organ - Limbs of Limbs of Frog, Limbs of Bat and Limbs of Lizard - Diagrams
2. Study of Analogous Organs – Wings of Insect, Wings of Bat and Wings of Bird - Diagrams

**II B.Sc., (BZC), SEMESTER-III**

**ZOOLOGY - PAPER – III (At the End of III semester)**

**PRACTICAL MODEL PAPER**

**CYTOLOGY, GENETICS AND EVOLUTION**

**Max marks: 50**

**Time : 2Hrs**

1. Prepare temporary slides of Mitotic divisions with onion root tips 10M

2. Identification of 5 spotters/Genetic Problems 4 X5=20M

A)--------------------(Cytology)

B)--------------------(Cytology

C)--------------------(Genetics)

D)--------------------(Genetics)

E)--------------------(Evolution)

3. Record 05M

4. Internal assessment 15M

**Total 50M**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**SEMESTER-IVCODE ZO4208**

**ZOOLOGY - PAPER – IV (Effective from 2018-2019)**

**EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY**

|  |  |
| --- | --- |
| **OBJECTIVES** | **LEARNING OUTCOMES** |
| This course reviews the physiology of humans, placing particular emphasis on Digestion ,Respiration, circulation, Muscle, Excretion, Nervous system The approaches taken include those based on organ systems and a comparative approach describing similar organ systems in different taxa.Some consideration of how physiological systems are adjusted to function throughout the wide range of environments in which animals live.Ecology :To Know The inter-relationship between organisms in population and communities.To study the principle biogeochemical cycles.Zoogeography: To study the concepts of zoogeography and, zoogeographical importance of Indian subcontinent.Embryology Define the listed key terms of embryology.Gametogenesis and Fertilization.Map the path on egg follows starting at the ovary to implantation. Name the major structures and stages involved. | On satisfying the requirements of this course, students will have the knowledge and skills to:1. Describe the physiology of major organs and organ systems in humans and other mammals2. Understand and interpret the interplay between different organ systems and cellular responses to environmental change3. Apply experimental design skills to understanding 4.At the end of the course student will be equipped with the different types of community interactions and their significance at the community level and the mechanism and the process of bio geochemical cycles 5.Concepts of population dynamics and the population control measures will be imparted to the students.6.Concept of zoogeography, zoogeographical importance of Indian subcontinent in terms of biodiversity will be learnt by the student7. Student will learn about the concepts of embryology 8. Significance of germinal layers will be learnt by the student.9. Concepts of embryonic development will be learnt. |

**Hours: 4 Credits 3**

**Module - I**

**Embryology**

* 1. Gametogenesis
	2. Types of eggs ,Fertilization, Types of cleavages
	3. Development of Frog upto formation of primary germ layers
	4. Development, types and functions of Placenta in mammals

**Module - II**

**Physiology -1**

2.1 Process of digestion and Absorption

2.2. Respiration - Pulmonary ventilation, transport of oxygen and carbondioxide

2.3. Circulation - Structure and functioning of heart, Cardiac cycle

2.4. Excretion - Structure of nephron, urine formation, counter current mechanism

**Module - II**

**Physiology -2**

3.1.Nerve impulse transmission - Resting membrane potential, origin and

propagation of action potentials along myelinated and non-myelinated nervefibe

3.2.Muscle contraction - Ultra structureofmuscle fibre,molecular andchemical basis

of muscle contraction

3.3Endocrine glands - Structure, secreionsandthe functions(of hormones)of pituitary,

thyroid, adrenal glands and pancreas

3.4Hormonal control of reproduction in a mammal

**Module - II**

**Ecology**

4.1. Scope of Ecology; Important abiotic factors of Ecosystems – Temperature, Light, Water,

 Nutrient Cycles- Nitrogen, Carbon and Phosphorus

4.2. Food Chain and food web; Energy Flow in an Ecosystem

4.3. Habitat, Ecological niche; Community Interations-Mutualism, Commensalism,

 Parasitism, Competetion, Predation Dynamics

4.4. Zoogeographical regions; Study of physical and faunal peculiarities of Oriental,

Australian and Ethiopianregions

**References**

1. Cohn, N.S., 1979, Elements of Cytology, Freeman Book Co., New Delhi

2. De Robertis, E.D.P. and E.M.F. De Robertis, 1988. Cell and Molecular Biology,

3. Gies, A.C., 1979. Cell Physiology, Saunders Co., Philadelphia, London, Toronto, 609p.

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5. Verma, P.S. and V.K. Agarwal, 1995. Cell and Molecular Biology, 8th edition, S. Chand &  Co.

6. Rastogi. S.C. Cell and Molecular Biology, 2008 2nd Edition, New Age International (p)     Ltd.,

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**SEMESTER-IVCODE ZO4208**

**ZOOLOGY - PAPER – IV (Effective from 2018-2019)**

**EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY**

BLUE PRINT FOR QUESTION PAPER SETTING

|  |  |  |  |
| --- | --- | --- | --- |
| **Module Name** | **PART I****Essay Type Questions****10 marks each** | **Part II Short Answer Questions****5 marks each** | **Marks Allotted to the Chapter** |
| 1. **Embryology**
 | **2** | **02** | **30** |
| 1. **Physiology 1**
 | **1** | **03** | **25** |
| 1. **Physiology 2**
 | **2** | **02** | **30** |
| 1. **Ecology**
 | **1** | **03** | **25** |
| 1. **Total**
 | **06****Of which 3 to be answered** | **10****Of which 6 to be answered** | **110 Marks including choice.****Of which 60 Marks to be answered** |

**NOTE: The question paper setters are requested to kindly adhere to the format given in the above table.**

**SEMESTER-IVCODE ZO4208**

**ZOOLOGY - PAPER – IV (Effective from 2018-2019)**

**EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY**

**MODEL QUESTION PAPER**

**Time: 2 ½ hrs. Max Marks: 60**

**PART – 1**

**Note :Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessary 3 X10 = 30**

**SECTION- A**

1. Write an essay on the spermatogenesis; write a note on the structure of the mature sperm

2. Describe different types and functions of placenta

3. Explain the Structure and function of heart

**SECTION-B**

4. Write an essay on Nerve impulse propagation

5. Harmonal Control of reproduction in a mammal

6. Write an essay on the different types of interaction found in the community with suitable

examples.

**Part – II**

 Answer any **Six** questions **6x5=30**

7. Types of Eggs

8. Fertilization

9. Transport of oxygen

10. Structure of Nephron

11. counter current mechanism

12. Hormones of pancreas

13. Sarcomere

14. Phosphorus cycle

15. Fauna of Australian region

16. food chain

**ZOOLOGY PRACTICAL SYLLABUS FOR IV SEMESTER**

**ZOOLOGY - PAPER – IV (At the End of IV semester)**

**EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY**

**Max marks: 50**

**Time : 2Hrs**

**I. Embryology**

1. Study of T.S. of testis, ovary of a mammal

2. Study of different stages of cleavages (2, 4, 8 cell stages)

**II. Physiology**

1. Qualitative tests for identification of carbohydrates, proteins and fats (2 for each)

2. Study of prepared slides of T.S. of liver, kidney, bone, charts showing pituitary,

 thyroid, adrenal and pancreas glands

**III. Ecology**

1. Determination of pH of given sample

2. Estimation of dissolved oxygen of given sample

3. Estimation of salinity of given sample

**ZOOLOGY - PAPER – IV (At the End of IV semester)**

**EMBRYOLOGY, PHYSIOLOGY AND ECOLOGY**

**PRACTICAL MODEL PAPER**

**Max marks: 50**

**Time : 2Hrs**

1. Estimate DO/PH/Proteins/carbohydrates/lipids of a sample 10M

2. Identification of 5 spotters/Genetic Problems 4 X5=20M

A)--------------------(Embryology)

B)--------------------(Embryology)

C)--------------------(Physiology

D)--------------------(Physiology)

E)--------------------(Physiology)

3. Record 05M

4. Continuous Internal Assessment 15M

**Total 50M**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

(WITH EFFECTIVE FROM 2016-17)

**SEMESTER-V CODE ZO 5508-C**

**ZOOLOGY SYLLABUSADVANCED CORE**

 **TITLE: ANIMAL PHYSIOLOGY**

 CREDITS: 3T+2P Hrs : 3 T+ 3 P /week

|  |  |
| --- | --- |
| **OBJECTIVES** | **LEARNING OUTCOMES** |
| * This course reviews the physiology of humans, placing particular emphasis on Digestion ,Respiration, circulation, Muscle, Excretion, Nervous system
* The approaches taken include those based on organ systems and a comparative approach describing similar organ systems in different taxa.
* Some consideration of how physiological systems are adjusted to function throughout the wide range of environments in which animals live.
 | On satisfying the requirements of this course, students will have the knowledge and skills to:1. Describe the physiology of major organs and organ systems in humans and other mammals2. Understand and interpret the interplay between different organ systems and cellular responses to environmental change3. Apply experimental design skills to understanding population responses and interpreting quantitative data |

**Module I : 20 Hrs**

* **Physiology of Digestion**

1.1. Definition of digestion and types of digestion – extra and intracellular.

1.2. Digestion of Carbohydrates, proteins, lipids and cellulose.

1.3. Gastrointestinal hormones- control of digestion in mammals

* **Physiology of respiration**

1.4. Types of respiration – external and internal respiration.

1.5 Transport of oxygen – Oxygen dissociation curves.

1.6 Transport of CO2 – Chloride shift, Bohr effect.

**Module II 20 Hrs**

* **Physiology of Circulation**

2.1 Structure of mammalian heart and its working mechanism-

2.2 Cardiac cycle., ECG.

2.3 Myogenic and neurogenic hearts.

* **Physiology of Excretion**

2.4 Gross organization of mammalian excretory system

2.5 Structure of kidney.

2.6 Structure and function of Nephron – Counter current mechanism.

**Module III**

* **Physiology of muscle contraction 08 Hrs**

3.1 Ultra structure of skeletal muscle.

3.2 Sliding filament mechanism of muscle contraction.

3.3 Chemical changes during muscle contraction

3.4 Phasic and Tonic contractions

**Module IV**

* **Physiology of nerve impulse 12 Hrs**

4.1Nature of nerve impulse – resting potential and action potential.

4.2 Properties of nerve impulse  threshold value, refractory period, all or none response.

4.3 Conduction of nerve impulse along an axon.

4.4 Structure of synapse, mechanism of synaptic transmission – electrical and chemical transmissions

* **Physiology of Reproduction**

4.5. Mammalian male & female reproductive anatomy- Male and femalereproductive hormones

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**III Year B.Sc., Zoology**

**Course: ADVANCED CORE, TITLE: ANIMAL PHYSIOLOGY**

**at the end of V Semester**

**Under CBCS Pattern**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Module Name  | PART I Essay Type Questions | Part II Short Answer Questions | Part IIIVery Short Answer Type Questions  | Marks Allotted to the Chapter  |
|  | Section A | SectionB |
| **I.** Physiology of Digestion, Physiology of respiration | 2 |  | 02 | 03 | 36 |
| **II.** Physiology of Circulation Physiology of Excretion |  | 2 | 02 | 03 | 36 |
| **III.** Physiology of muscle contraction | 1 |  | 01 | 04 | 23 |
| **IV.**Physiology of nerve impulse Physiology of Reproduction |  | 1 | 02 | 02 | 24 |
| Total | 06 Essay questions choice of which 03 to be answered | 07 Short answer Questions choice of which 4 to be answered | 12 Very short answer question choice of which 10 to be answered  | **Total 119** MarksOf which choice of **70 Marks** to be answered  |

**MODEL QUESTION PAPER**

**P R GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA**

**III Year B.Sc., ADVANCED CORE, TITLE ANIMAL PHYSIOLOGY**

**at the end of V Semester (CBCS) W.E.F., 2016-17**

**Max Marks 70 Time 3 hrs.**

**PART I**

**Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessary 3 x 10 = 30 Marks**

**SECTION – A**

1.Write an essay on the Carbohydrates digestion.

2. Describe the Oxygen transport mechanism in respiration

3. Explain in detail sliding filament mechanism of muscle contraction

**SECTION –B**

4. Describe the structure and function of human heart.

5. Write an essay on the mechanism of Urine formation in nephron.

6. Describe the nerve impulse transmission along the length of the axon .

**PART –II**

**Answer any FOUR questions 4 x 5 = 20Marks**

7. Digestion of cellulose

8. Bohr effect

9. ECG

10. Structure of kidney

11. Cori cycle

12.Endocrine regulation of testicular function

13.Synaptic transmission

**PART III**

**Answer any TEN questions 10 x 2 = 20 Marks**

14. Gastrin

15.Nasal cavity

16.Alveloi

17.Purkinjiee fibres.

18.Pace maker

19. Tubular secretion

20. Sarcomere

21. Z line

22. Triad system

23. Cross bridges

24.Na-K Pump

25.Progesterone

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**III Year B.Sc., Zoology**

**Course: ADVANCED CORE ANIMAL PHYSIOLOGY – PRACTICAL SYLLABUS**

**CODE ZO 5508-CP**

**At the end of VSemester Under CBCS Pattern**

**SYLLABUS**

1. Identification tests for Carbohydrates, Proteins, and Lipids.
2. Action of salivary amylase enzyme .
3. Haemoglobin estimation by Sahli’s method
4. Total Blood cell count (RBC & WBC)
5. Urine test for Ammonia/urea/uric acid
6. Slides: T.S of Kidney, Un-Striated, Striated and Cardiac muscles, Nerve cell.

**Model paper for Practical semester End Examination**

Max. Marks 50 Time: 2 Hours

1. Test for Identification of protein/Carbohydrate/Lipid anyone test : 20M
2. Blood: Estimation of HB/RBC/WBC counting: 10 M
3. Test for excretory products/ Salivary amylase/

 identification of any two slides 10M

1. Record 05 M
2. Viva-voce 05 M

**Total 50M**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**ZOOLOGY SYLLABUS**

(WITH EFFECTIVE FROM 2016-17)

**ADVANCED ELECTIVE 2 - CONSERVATION BIOLOGY**

**Course code ZO 5508-2 SE**

**Conservation Biology** -**WILDLIFE CONSERVATION**

**Credits: 02T+2 P HOURS : 2T+3P**

**Module 1.Wildlife History 15 Hrs**

1. Conservation - Scope and History

1.1 History of conservation in India- Status of wildlife in India

1.2 Causes of depletion of Wildlife resources - habitat loss, construction of dams, collection for        trophies, hunting, poisoning, poaching and other developmental activities.

**Module 2 Wildlife Habitat 15 Hrs**

2.1 Mention major animalspecies of Indian forests.

2.2 A forestation & Reforestation.

2.3 Grasslands, Mangroves and Sacred groves

2.4 In Situ and Ex situ conservation (Gene banking, conservation and exchange)

**Module 3 Wild life management 15 Hrs**

3.1..Role oftribals in Wildlife conservation - Joint Forest Management

3.2. . Illegal Wildlife Trade and Pet Trade in India

3.3 Protected Areas , National parks and Sanctuaries: Important National Parks and Sanctuaries in         India with special importance to Andhra Pradesh

3.4. Wildlife - Laws and Regulation . RAMSAR site

**Module 4 Wild life conservation 15 Hrs**

4.1 Red Data Book IUCN criteria and definition regarding extinct (EX), extinct in the wild (EW),  critically endangered (CD), low risk (LR), data deficient (DD) & not evaluated animals (NE).

4.2 Important Endangered wild life of India.

4.3. Conservation Schemes : Project Tiger, Crocodile breeding project, Gir Lion Project,Olive Ridley, Whale shark,Fishing cat, Mangrove Otter,

4.4 .Tourism and Wildlife - Importance of Tourism in Wildlife conservation

**References:**

1. Abdul Jamil Urfi (2004): Birds beyond Watching, University Press (India) Pvt. Ltd.

2.Dasmann, R.F. (1964) Wildlife biology, John Wiley and Sons, New York.

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**BLUE PRINT**

**III Year B.Sc., Zoology**

**Course: ADVANCED ELECTIVE 2 - CONSERVATION BIOLOGY**

**Conservation Biology** -**WILDLIFE CONSERVATION**

**At the end of V Semester under CBCS Pattern**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Module Name**  | **PART I** **Essay Type Questions** | **Part II Short Answer Questions** | **Part III****Very Short Answer Type Questions**  | **Marks Allotted to the Chapter**  |
| 1. **Wildlife History**
 | **1** | **02** | **03** | **26** |
| 1. **Wildlife Habitat**
 | **1** | **02** | **03** | **26** |
| 1. **Wild life management**
 | **2** | **01** | **02** | **29** |
| 1. **Wild life conservation**
 | **2** | **02** | **02** | **34** |
| 1. **Total**
 | **06 Essay questions choice of which 04 to be answered** | **07 Short answer Questions choice of which 4 to be answered** | **10 Very short answer question choice of which 5 to be answered**  | **Total 115 Marks** **Of which choice of 70 Marks to be answered**  |

**MODEL QUESTION PAPER**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

(WITH EFFECTIVE FROM 2016-17)

**Course code ZO 5508-2 SE**

**SEMESTER-V**

**ADVANCED ELECTIVE 2 - Conservation Biology** -**WILDLIFE CONSERVATION**

**Max Marks: 70 Time : 3 Hrs.**

**PART I**

**Note: Answer any FOUR questions from the following 4 x 10 = 40 Marks**

1. Write an essay on the status of wild life conservation in India.

2. Explain different animal species of Indian forests.

3. Explain about the Illegal wild life trade.

4. Explain the wild life laws and regulations.

5. Write an essay any four wildlife conservation schemes.

6. Describe the role of tourism in wild life conservation.

**PART –II**

**Answer any FOUR questions 4 x 5 = 20 M**

7. Poaching

8. Causes for wild life depletion

9. Mangroves

10. Sacred groves

11. Illegal wild life trade

12. Red data Book

13. Crocodile Breeding project

**PART III**

**Answer any FIVE questions 5 x 2 = 10 M**

14. Jim carbet National Park 15. WWF

16. CITES 17. Deforestation

18. Grassland ecosystem 19. Project Tiger

20. Coringa wild life sanctuary 21. RAMSAR site

22. Endangered Species 23. Olive Ridley

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**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

(WITH EFFECTIVE FROM 2016-17)

**Course code ZO 5508-2 SE-2**

**SEMESTER-V**

**ADVANCED ELECTIVE 2 - Conservation Biology** -**WILDLIFE CONSERVATION**

**Maximum marks: 50**

**Practical Syllabus**

1. Lab Work:
2. Intertidal –Muddy shore fauna specimens

Annelids: *Arenicola, Aphrodite, Neries*

Crustaceans: *Uca, Scylla serrata, Clibamarius (Hermit crab)*

Molluscs: *Littorina, Teredo, Telescopium,Onchidium. Murex*

Echinoderms: *Sea cucumber*

Fishes: *Periopthalmus(Mud skipper)*

1. Field Visit to Coring Wild life sanctuary – Wild life conservation- plan, observations.
2. Preparation of conservation plan for a set of situations

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

(WITH EFFECTIVE FROM 2016-17)

**Course code ZO 5508-2 SE-2**

**SEMESTER-V**

**ADVANCED ELECTIVE 2 -Conservation Biology** -**WILDLIFE CONSERVATION**

**PRACTICAL MODEL PAPER**

Max. Marks 50 Time 3 Hrs

1. Identification of the Muddy shore specimens: A, B C, D 4X5= 20M

 1 Mark for Identification

 1 Mark for diagram

2 Marks for the characters, Special adaptation of the environment should be focused.

 2. Filed note Book. Visit to wild life sanctuary 10 M

* 1. Note book should depict the dates of visits, observations, outcomes and interactions.

 3. Preparing a plan for the conservation for a given situation 10 M

 4. Record 05 M

 5. Viva-Voce 05 M

 **Total 50 M**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**ZOOLOGY SYLLABUS**

(WITH EFFECTIVE FROM 2016-17)

**SEMESTER-VI**

**SKILL BASED CORE COURSE CODE : ZO 6608-C**

**TITLE: BIOMOLECULES , ENDOCRINOLGY & ANIMAL BIOTECHNOLOGY**

**Credits: 3+2 Hrs: 3+3**

**Module I: Bio Molecules**

* **1.1 Carbohydrates:**

1.1.1General properties ,Classification of Carbohydrates,

1.1.2 Structure of Monosaccharides (Glucose and Fructose)

1.1.3 Structure of Disaccharides (Lactose and Sucrose)

1.1.4 Structure of Polysaccharides (Starch, Glycogen and Chitin)

* **1.2Proteins**

1.2.1.Amino acids: General properties, nomenclature, classification and structure.

1.2.2.Classification of proteins based on functions,

1.2.3 peptide bond and structure (Primary, secondary, tertiary and quaternary structures)

* **1.3 Lipids**

1.3.1 General properties ,Classification. Structure of Fatty acids (Saturated and unsaturated).

1.3.2 Triacylglycerols, Phospolipids (Lecithin and cephalin)

1.3.3 Structure of Steroids (Cholesterol).

**Module II :Endocrinology-1**

2.1 Relationship between hypothalamus and pituitary gland.

2.2Hormones of hypothalamus.

2.3 Hormones of Adenohypophysis and Neurohypophysis

**Module III:** .**Endocrinolgy-2**

.3.1 Hormones of pineal gland, thyroid gland, parathyroid, thymus, adrenal and pancreas.

3.2 Hormonal  control of menstrual cycle in humans.

3.4 Homeostasis and its basic working mechanism

**Module IV:Animal Biotechnology**

4.1 Animal Biotechnology: Scope of Biotechnology

4.2 Cloning vectors - Characteristics of vectors, Plasmids.

4.3 Gene Cloning – Enzymatic cleavage of DNA, Restriction enzymes (Endonucleases) and Ligation.

4.4 Transgenesis and Production of transgenic animals (Fish and Goat).

4.5 Application of Stem Cell technology in cell based therapy (Diabetes and Parkinson’s diseases).

**III Year B.Sc., Zoology**

**Course: BIOMOLECULES , ENDOCRINOLGY & ANIMAL BIOTECHNOLOGY**

**( at the end of VI Semester)**

**Under CBCS Pattern**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Module Name  | PART I Essay Type Questions | Part II Short Answer Questions | Part IIIVery Short Answer Type Questions  | Marks Allotted to the Chapter  |
|  | Section A | Section B |
| I. Bio Molecules | 2 |  | 02 | 02 | 34 |
| II. Endocrinology -1 | 1 |  | 02 | 02 | 34 |
| III. Endocrinology -2 |  | 2 | 01 | 05 | 35 |
| IV. Animal Biotechnology |  | 1 | 02 | 03 | 36 |
| **Total** | 06 Essay questions choice of which 03 to be answered | 07 Short answer Questions choice of which 4 to be answered | 12 Very short answer question choice of which 10 to be answered  | **Total 119** MarksOf which choice of **70 Marks** to be answered  |

**MODEL QUESTION PAPER**

**P R GOVERNMENT COLLEGE (AUTONOMOUS), KAKINADA**

**III Year B.Sc., BIOMOLECULES , ENDOCRINOLGY & ANIMAL BIOTECHNOLOGY**

**At the end of VI Semester**

**(CBCS) W.E.F., 2016-17**

**Max Marks 70 Time 3 hrs.**

**PART I**

**Note: Answer any THREE questions choosing at least one question from each section. Draw the diagrams where ever necessary 3 x 10 = 30 M**

**SECTION – A**

1. Write an essay on the general characters and classification of carbohydrates.
2. Explain the peptide bond and its structure in proteins.
3. Explain in relationship between hypothalamus and hypophysis.

**SECTION –B**

1. Describe the structure and function of the thyroid gland.
2. Describe the hormonal control of menstrual cycle in humans
3. Write an essay on the gene cloning

**PART –II**

**Answer any FOUR questions 4 x 5 = 20M**

1. Glucose
2. Cholesterol
3. Hypothalamus
4. Neurohypophysis
5. pancreas
6. Stem cells
7. Cloning Vector

**PART III**

**Answer any TEN questions 10 x 2 = 20 M**

14. Lecithin 20. Paratharmone

15. Cephalin 21.Thyomsin

16. Hypothyroidism 22.Ligation

17. Neurosecretion.23.Restriction endonuclease

18. Adrenal medulla 24. Prolactin

19.Melatonin 25. Insulin

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**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**ZOOLOGY SYLLABUS**

(WITH EFFECTIVE FROM 2016-17)

**SEMESTER-VI**

**SKILL BASED CORE COURSE CODE: ZO 6608-CP**

**TITLE: BIOMOLECULES, ENDOCRINOLGY & ANIMAL BIOTECHNOLOGY**

**Practical syllabus**

1. Estimation of Blood glucose by GOD-POD method
2. Paper Chromatography for the Amino Acids ( Any Two amino acids)
3. Dissection and display of fish for the Pituitary gland
4. Charts or Models of Endocrine glands
5. Cloning vectors\_ charts
6. Transgenic animals – charts/models
7. Demonstration of endonuclease action by using the PCR.

**GENERAL CORE COURSE CODE: ZO 6608-CP**

**TITLE: BIOMOLECULES, ENDOCRINOLGY & ANIMAL BIOTECHNOLOGY**

**Practical Model paper**

Max Marks: 50 Time 2hrs

1. Estimation of Blood glucose by GOD-POD/Paper Chromatography-------20M
2. Identification of Charts of endocrine glands/

/Cloning vectors/ Transgenic animals 4 x5 = 20M

1. Record 05 M
2. Viva –Voce 05 M
3. Total 50 M

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**ZOOLOGY SYLLABUS**

(WITH EFFECTIVE FROM 2016-17)

**Course code ZO 5508-SE-1**

**SEMESTER-VI**

**ADVANCED ELECTIVE 2: BIOINFORMATICS**

CREDITS: 2T+2P Hrs : 2T +3P

|  |  |
| --- | --- |
| **OBJECTIVES** | **LEARNING OUTCOMES** |
| * This course reviews the basic concepts of bio informatics
* The approaches taken include those based on imparting the skill orientation to the subject.
* Course will be useful as a bridge course for the pursuance of the applied courses in the relevant subject.
 | On satisfying the requirements of this course, students will have the knowledge and skills on Bio informaticsBasics of bioinformatics will be acquired by the student at the UG level.Helps the students as a foundation course for the vertical mobility. |

**Module –I. Basic Computers MS Word 15 Hrs**

MS-WORD: File Operations New, Save & Print - Editing: Cut, copy, Paste, Find andReplace - Insert: Page numbers and Pictures - Format: Font, Bullet & Numbering, Paragraph and Background Tools: Spelling and Grammar - Data :Sort .

**Module –II Basic Computers MS Excel 15 Hrs**

MS. EXCEL: Presentation of Bio statistical data using Excel: Auto sum, Paste function, Chart wizard, sort function and Drawing - Use of Internet, Messenger and e-mail-Basic knowledge of Medical transcription and Bio-informatics.

**Module –III Fundamentals of Bio Informatics 15 Hrs**

Bioinformatics-Definition-Literature databases-NCBI-Pubmed, Medline, Protein and nucleic sequence databases-PIR, Swiss-prot, GeneBank, DDBJ-structure databases - PDB, SCOP, CATH, structure visualization Tools, RasMol, Swiss PDB viewer.

**Module –IV Techniques of Bio informatics 15 Hrs**

Pairwise sequence Alignment – Scoring Matrices-PAM and BLOSUM-Statistics ofalignment scored Dot plot – local and global alignment – Database Searching – FASTA and BLAST multiple sequence alignment clusters W-Phylogenetic trees-PHYLIP.

**References :**

1. Goutham Roy. Introduction to Computing and Computing lab and Cad[2002] Books and allied

2. MS. OFFICE for Win-Microsoft office press.

3. Developing Application with MS. OFFICE – Christine. Solomon- Microsoft Office     Press.

4. Developing Bioinformatics Computer Skills Cynthia Gibbs, Sheoff

5. Arthur. M. Lesk, Introduction to Bioinformatics, Oxford University Press, New Delhi,     2003.

6.Arthur. M.Lesk, Introduction to Protein Structures Oxford University Press, New Delhi,    2000

7. Baxevanis, A and Outllette. Bioinformatics a practical guide to the analysis of genes and proteins, Wily - Interscience, Hoboken, NJ. USA

**BLUE PRINT**

**III Year B.Sc., Zoology**

**Course: ADVANCED ELECTIVE 2: BIOINFORMATICS**

**at the end of VI Semester Under CBCS Pattern**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Module Name  | PART I Essay Type Questions | Part II Short Answer Questions | Part IIIVery Short Answer Type Questions  | Marks Allotted to the Chapter  |
| 1. Basic Computers MS Word
 | 2 | 01 | 02 | 29 |
| 1. Basic Computers MS Excel
 | 1 | 02 | 03 | 26 |
| 1. Fundamentals of Bio Informatics
 | 2 | 01 | 02 | 29 |
| 1. Techniques of Bio informatics
 | 1 | 02 | 03 | 26 |
| **Total** | 06 Essay questions choice of which 04 to be answered | 06 Short answer Questions choice of which 4 to be answered | 10 VSA questions choice of which 5 to be answered  | **Total 110** Marks Of which choice of **70 Marks** to be answered  |

**MODEL QUESTION PAPER**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**(WITH EFFECTIVE FROM 2016-17)**

**Course code ZO 5508-1 SE**

**SEMESTER-VI ADVANCED ELECTIVE 2: BIOINFORMATICS**

**Time:3 Hrs. Max Marks: 70**

**PART I**

**Note: Answer any fourquestions from the following: 4 x 10 = 40 M**

1. Write an essay on different file operations in MS word.

2. Describe the format options in MS office.

3. Explain in detail the Protein and nucleic acid sequence databases.

4. Explain in detail various structure visualization Tools

5. Describe the presentation of bio statistical data using MS excel.

6. Write an essay about the medical transcription and its applications

**PART –II**

**Answer any FOUR questions 4 x 5 = 20 M**

7. Edit option in MS word

8. Chart wizard in excel

9. Gene Bank

10. Swiss PDB viewer

11.Pair wise sequence Alignment

12. Phylogenetic trees

**PART III**

**Answer any five questions 5 x 2 = 10 M**

13. Find and replace in MS word 14. Bullets in MS word

15. Sort in MS excel 16. Auto sum

17. Paste in excel 18. PIR

19. Swiss port 20. PHYLIP

21. FASTA 22.Data base searching

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**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**ZOOLOGY SYLLABUS**

**(WITH EFFECTIVE FROM 2016-17)**

**Course code ZO 5508-1 SE**

**PRACTICAL SYLLABUS**

**SEMESTER-VI**

**ADVANCED ELECTIVE 2: BIOINFORMATICS**

**Max Marks 50 Time 2hrs.**

1. Lab work : MS word – File
2. Lab Work MS Excel- work sheet, data, chart
3. Medical transcription tools
4. E-mail
5. Bio Informatics Applications - Lab work
6. Record
7. Total

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**ZOOLOGY SYLLABUS**

(WITH EFFECTIVE FROM 2016-17)

**Course code ZO 5508-1 SE**

**PRACTICAL MODEL QUESTION PAPER**

**SEMESTER-VI**

**ADVANCED ELECTIVE 2: BIOINFORMATICS**

**Max Marks 50 Time: 2 hrs.**

Practical on the computer

1.MS word document preparation - 05 M

2.MS Excel spread sheet - 15 M

3.Medical Transcription tool - 10 M

4.Bioinformatics tools any Two - 10M

5.Record - 05 M

6.Viva-Voce - 05 M

**Total 50 Marks**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM -ZOOLOGY SYLLABUS**

(WITH EFFECTIVE FROM 2016-17)

**SEMESTER-VI --- Code : ZO SE-6608-1SE**

**SKILL BASED ELECTIVE 1: FISHERIES AND AQUACULTURE**

**HOURS 2T+3P CREDITS 2+2**

|  |  |
| --- | --- |
| **OBJECTIVES** | **LEARNING OUTCOMES** |
| * .To provide students with the knowledge, understanding and skills required to apply theoretical principles of fishery management, aquaculture and fish biology in industry.
* To raise student aspirations and achievement through the development of scientific, technical and vocational skills required in their chosen area of employment in the fisheries industry
* To develop students’ practical skills such as fish surveying, fish husbandry, identification and treatment of diseases.
 | * Students will have a thorough understanding of aquaculture Students will become familiar with the major types and components of aquaculture systems
* Students will have experiential learning opportunities (e.g., hands-on experiences at laboratories, farms, demonstration centers) to acquire skills and abilities including hatchery, grow out, harvesting and marketing of aquaculture species to enhance their competitiveness in their future careers.
 |

**Module I** :

Global scenario of fisheries and aquaculture- Different riverine systems – Importance, production trends and present status. Types of fisheries cage& pen culture - Fishery resources from Freshwater, Brackish water and Marine habitat. Characters for selectionof cultivable species of fish and Prawn. **15 Hrs**

**Module II :**

Induced Breeding in *Carp &Magur*-Criteria for Site selection, Farm Management - Physico-chemical and Biological properties of water used in the Aquaculture systems. **15 hrs**

**Module III**:

Hatchery technology of shrimp (*Penaeusmonondon)* Shrimp Hatchery design and Management. Larval rearing – Pre-pond preparation Nursery ponds, rearing and grow out ponds- Shrimp feed & feeding management. **15 Hrs**

**Module IV**:

Some important finfish and shell fish diseases, prophylaxis symptoms and treatment. Different types of Fish Preservation - processing techniques – Solar drying, salting, smoking, Freezing and canning. Fish products and their uses- fish by products and their uses. **15 Hrs**

**Additional Module:** Value addition : Fishery products, fishery by products and fish processing (**Skill based Hands on Training in collaboration with the NFDB)**

References

1. A text book of fish biology and fisheries Khanna &singh Narendra Publication

2. Handbook of freshwater fishes of India Beaven R Techno

3. Textbook of fish diseases Amalacher, E Narendra

4. Fish and Fisheries of India V G Jhingran

5. Prawns and Prawn Fisheries Kurien, Sebastian

6. Advances in Fisheries and Fish Production S.H. Ahmed

7. Aquaculture and Fisheries - N. Arumugam

8. A Text Book Of Fishery Science And Indian Fisheries Paperback – 2006 by Dr C B L Srivastava (Author)

**MODEL QUESTION PAPER**

**BLUE PRINT**

**III Year B.Sc., Zoology**

**Course: SKILL BASED ELECTIVE –1 FISHERIES AND AQUACULTURE**

**At the end of VISemester Under CBCS Pattern**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Module Name**  | **PART I** **Essay Type Questions** | **Part II Short Answer Questions** | **Part III****Very Short Answer Type Questions**  | **Marks Allotted to the Chapter**  |
| 1. Introduction to Fisheries
 | **1** | **02** | **03** | **26** |
| 1. Induced Breeding
 | **1** | **02** | **03** | **26** |
| 1. Shrimp Hatchery
 | **2** | **01** | **02** | **29** |
| 1. Fish and shrimp diseases,& Fish Preservation and processing
 | **2** | **02** | **02** | **34** |
| 1. **Total**
 | **06 Essay questions choice of which 04 to be answered** | **07 Short answer Questions choice of which 4 to be answered** | **10 Very short answer question choice of which 5 to be answered**  | **Total 115 Marks** **Of which choice of 70 Marks to be answered**  |

**Semester end examination 70Marks**

**Internal Assessment 30Marks**

**MODEL QUESTION PAPER**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**(WITH EFFECTIVE FROM 2016-17) Course code ZO 6508-1 SE**

**SEMESTER-VI SKILL BASED ELECTIVE 1: FISHERIES AND AQUACULTURE**

**Max Mark: 70 Time: 3 Hrs.**

**PART I**

**Note: Answer any FOUR questions from the following: 4 X10 = 40 M**

1. Write an essay on different Fishery resources of our state.

2. Explain the process of induced breeding in major carps.

3. Describe various sections of shrimp hatchery.

4. Write various steps in pre-pond preparation in shrimp culture.

5. Write an on essay different preservation technique of Fishes.

6. Describe some important finfish and shellfish diseases.

**PART –II**

**Answer any FOURquestions 4 X 5 = 20 M**

7. Brackishwater fisheries and potential species cultured in brackish water

8. Characters of cultivable species of fish

9. Site selection criteria for aqua culture system

10. Biological characters of water for aqua culture

11. Shrimp seed transport

12. White spot syndrome virus

13. Fish Oils

**PART III**

**Answer any five questions 5 x 2 = 10 Marks**

14. Mariculture

15. Off shore fishery

16. Cage culture

17. Sand filter.

18**.** Ovaprim

19. Race way culture

20. Post Larva

21. *Artemia*

22. Salting

23. Canning.

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**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**(WITH EFFECTIVE FROM 2016-17)**

**Course code ZO 6508-1 SE**

**Practical Syllabus**

**Maxmarks 50**

**Time 2 hours**

1. Identification of FW fishes – Catla, LabeoCirrhinus, Cyprinus
2. Identification of Brackish Water fishes – Mugil, Chanoschanos, Etroplus, Latescalcarifer
3. Identification of Shell fish – Penaeus monodon, Macrobrachium, Scylaserrata, Vennami
4. Identification of Marine fishes – Sardinella, Rostralleger, Scomboromerus, Trichiurus
5. Identification of fish/Prawn diseases – Dropsy, Fin and Tail rot, White spot disease

Model Question Paper

1. Identify the following spotters 5x4=20M

A FW fish

B BW fish

C Marine fish

D Shell fish

E Fish disease

1. Viva 5M
2. Record 5M
3. Internal Assessment 15M

**Total 50M**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**(WITH EFFECTIVE FROM 2016-17)**

**Course code ZO 6508-1 SE**

**SEMESTER-VI SKILL BASED ELECTIVE : FISHERIES AND AQUACULTURE PROJECT WORK**

Project work : 50M

Dissertation : 30M

Seminar : 20M

Total :100M

Dissertation is on the aquaculture and fishery sector.

Areas: 1. Different types of Aqua Culture System

 2. Fisheries Exports, trends and other standards for export.

 3. Feed- types, ingredients, proximate analysis

 4. Marketing of fish seed and feed

 5. Health management

 6. Bioremediation in aquaculture

 7. Green aquaculture

 8. Post harvesting technology and value added products

 Dissertation should be prepared basing on the field visits by the students.

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**ZOOLOGY SYLLABUS**

(WITH EFFECTIVE FROM 2014-2015)

**SKILL BASED ELECTIVE 2: CLINICAL SCIENCE**

**Code ZO-6608-SE2**

**HOURS 2T+3P Credits 2+2**

|  |  |
| --- | --- |
| **OBJECTIVES** | **LEARNING OUTCOMES** |
| * To perform  dependable and safe pathologic diagnosis
* To provide integrated anatomic pathology services based on state-of-the-art technology.
* To reinforce the managements  capacities of clinical Departments
* To strengthen the undergraduate and teaching activities.
* To expand collaborative and interdisciplinary research programs with other basic science and clinical Departments
 | * Have a systematic program of study.
* Demonstrate an investigatory and analytic approach to pathologic diagnosis or abnormal laboratory findings.
* Acquire the necessary computer skills to search the medical literature.
* Will be familiar with basic medical science principles and be able to apply them to clinical or pathologic problems.
* Will be able to synthesize clinical and pathologic findings.
 |

**Module I :Hematology** **20 Hrs**

1.1Blood composition and functions

1.2Blood groups and transfusion problems

1.3Blood diseases – Anaemia, Leukemia, Leucocytosis, Leucopaenia

1.4 Biopsy and autopsy – clinical importance

**Module II: Immunology 15 Hrs**

2.1Types of immunity – Innate and acquired

2.2Antigens – Haptenes and epitopes and their properties

2.3 Structure and biological properties of human immunoglobulin G (IgG)

2.4 Hypersensitivity – immediate and delayed.

**Module IIIImportant Human Parasites 15 Hrs**

 3.1Blood Parasites (Structure and Clinical significance of *Plasmodium,Trypanosoma, Leishmania       Sp*

3.2 Intestinal parasites – Structure and clinical significance (*Entamoeba*,*Giardia, T.solium, A.duodinale, E.vermicularis).*

**Module IV : 10 Hrs**

4.1Cholesterol and its significance in Cardiovascular problems

4.2 Blood Sugar levels and Diabetes

**MODEL QUESTION PAPER**

**BLUE PRINT**

**III Year B.Sc., Zoology**

**Course: SKILL BASED ELECTIVE –2 CLINICAL SCIENCE**

**At the end of VISemester Under CBCS Pattern**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Module Name | PART IEssay Type Questions | Part II Short Answer Questions | Part IIIVery Short Answer Type Questions | Marks Allotted to the Chapter |
| 1. Haematology
 | 2 | 01 | 02 | 29 |
| 1. Immunology
 | 1 | 02 | 03 | 26 |
| 1. Important Human Parasites
 | 2 | 02 | 02 | 34 |
| 1. Cardiovascular problems Blood Sugar levels and Diabetes
 | 1 | 02 | 03 | 26 |
| **Total** | 06 Essay questions choice of which 04 to be answered | 07 Short answer Questions choice of which 4 to be answered | 10 Very short answer question choice of which 5 to be answered | **Total 115** MarksOf which choice of **70 Mark**s to be answered |

**Semester end examination 70 Marks**

**Internal assessment 30 Marks**

**MODEL QUESTION PAPER**

**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**(WITH EFFECTIVE FROM 2016-17)**

**Course code ZO 6508-2 SE**

**SEMESTER-VI SKILL BASED ELECTIVE 2: CLINICAL SCIENCE**

**Max Marks: 70 Time: 3 Hrs.**

**PART I**

**Note: Answer any FOUR questions from the following: 4x 10= 40 M**

1. Write an essay on blood composition and its functions.

2. Write an essay on different blood diseases

3. Explain the process of hypersensitivity.

4. Describe the life cycle of *Plasmodium*.

5. Describe the life cycle of *Teniasolium*

6. Write an essay on different cardiovascular problems

**PART –II**

**Answer any FOUR questions 4 x 5 = 20 M**

7. Anaemia

8. Immunity

9. Immunoglobulin

*10.Leishmania*

*11.Giardia*

12.Diabeties

13. Entamoeba

**PART III**

**Answer any FIVE questions 5 x 2 = 10 M**

13. Transfusion

14. Agglutination

15.Antigen

16.Delayed hypersensitivity

17. Ig E

18.Cysticercus.

19.Sporozoite

**20.** Good cholesterol

21.Blood Sugar

22. Diabetes

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**P.R.GOVERNMENT COLLEGE (A), KAKINADA**

**CHOICE BASED CREDIT SYSTEM**

**(WITH EFFECTIVE FROM 2016-17)**

**Course code ZO 6508-1 SE**

**SEMESTER-VI SKILL BASED ELECTIVE 2: CLINICAL SCIENCE**

Total : 50 Marks

 1. Blood grouping, Estimation of Haemoglobin

 2. Identification of Blood diseases – Anaemia, Sickle cell anaemia, Haemophilia

 3. Identification of Blood parasites – Plasmodium, Lieshmania, Trypanosoma

 4. Identification of Intestinal parasites – Entamoeba, Taenia, Ascaris, Giardia, Balantedium

 5. Qualitative analysis of glucose in blood and Urine.

 .

Practical Model Paper

1. Identification of blood groups/estimation of Haemoglobin 10M
2. Identification of the following spotters 4x5=20M

A. Blood disease

B. Blood parasite

C. Intestinal Parasite

D. Intestinal Parasite

 III. Record 05 M

 IV Internal assessment 15 M

**Total 50 M**

**PROJECT WORK**

An Individual Project work is to be submitted in the clusters selected by the student. It should be in line with the dissertation work. It is individual project. It is valued as Cluster elective A3/B3. It should be hand written and containing a minimum of 50 pages with graphs/photographs/tables etc.

**CLUSTER II**

**ZOOLOGY SYLLABUS FOR CLUSTER ELECTIVE VIII-A: VI SEMESTER**

**MEDICAL DIAGNOSTICS**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Cluster Elective Paper: VIII-A-1**

**CLINICAL BIOCHEMISTRY**

Hours 60 Marks 60

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**UNIT – I: Basic Medical Laboratory Principles and Procedures:** **10 Hours**

Introduction to clinical biochemistry. Glassware. Solutions and Reagents – Normal, Molar, percent, buffer solutions and indicators. Equipments and Instruments – Centrifuges, Hot air oven, Incubator, Water bath, Photometer, Spectrophotometer, Analyzers. Quality Control.

**UNIT – II: Clinical Biochemistry of Carbohydrates, Proteins & Lipids:** **20 Hours**

Elementary classification and metabolism of carbohydrates. Properties of carbohydrates. Regulation of blood sugar and Diabetes. Glucose Tolerance Test. Glycosylated Haemoglobin. General classification of proteins. Structure of proteins. Summary of protein digestion and aminoacid metabolism. Determination of serum proteins. General lipid metabolism. Primary and Secondary Dyslipoproteinemias.

**UNIT – III: Clinical Biochemistry of Enzymes:** **10 Hours**

Enzymes as catalysts. Enzyme specificity. Factors which affect enzyme activity. Coenzymes and Isoenzymes. Enzymes classification and nomenclature. Enzymes in clinical diagnosis. Use of enzymes as reagents. Laboratory determinations of enzymes – Clinical significance of SGOT, SGPT, S.ALP, S.ACP, Serum Amylase.

**UNIT- IV: Water & Mineral Metabolism and Acid-Base Balance:** **10 Hours**

Body fluid distribution. Factors which influence the distribution of body water. Mineral metabolism. Importance of the trace elements. Flame photometry. Action of buffer systems. Disturbances in acid-base balance

**UNIT - V: Function Tests:** **10 Hours**

Diseases of the kidneys. Creatine metabolism. Bile pigment metabolism. Disordered Bilirubin metabolism. Hepatic Jaundice and Post hepatic jaundice. Ischemic heart disease. Clinical significance of gastric analysis.

**SUGGESTED READINGS**

* Park, K. (2007), Preventive and Social Medicine, B.B. Publishers
* Godkar P.B. and Godkar D.P. Textbook of Medical Laboratory Technology, II Edition, Bhalani Publishing House
* Cheesbrough M., A Laboratory Manual for Rural Tropical Hospitals, A Basis for Training Courses
* Guyton A.C. and Hall J.E. Textbook of Medical Physiology.
* Robbins and Cortan, Pathologic Basis of Disease, VIIIEdition.
* Prakash, G. (2012), Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Co. Ltd.

**Cluster Elective Paper: VIII-A-2**

**HAEMATOLOGY**

Hours 60 Marks 60 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**UNIT – I: Laboratory Preparation in Haematology:** **10 Hours**

Introduction to practical. Basic requirements. Collection of blood. Anticoagulants and effects of anticoagulants on blood cell morphology. Effects of storage of blood.

**UNIT – II: Routine Haematology:** **15 Hours**

Composition of blood. Haemoglobin synthesis. Various haemoglobins. Haemopoietic system of the body. Blood cell counts. Erythropoiesis, Leucopoiesis and development of blood corpuscles. Thrombopoiesis. Laboratory technique of haemocytometry. Clinical significance of Total erythrocyte count, total leucocyte count, differential count, erythrocyte sedimentation rate and platelet count.

**UNIT – III: Haemostasis and Haematological Diseases:** **15 Hours**

General consideration of blood coagulation. Mechanism of coagulation. The fibrinolytic mechanism. Clinical significance of routine coagulation tests. Anaemia. Various types of anaemias – Iron deficiency anaemia, Aplastic anaemia, Perinicious anaemia, Sideroblastic anaemia and Sickel cell anaemia. Other haematological diseases – HDNB, Thalassaemia, Leukaemia. Parasitic infections of blood – structure and life cycle of Plasmodium vivax, types of malaria, Structure and life cycle of Wchereriabancrofti.

**UNIT- IV: Automation in Haematology:**

General considerations. Blood cell counters. Automated coagulated systems. Flow through cytochemical differential counter **10 Hours**

**UNIT - V:** Immunohaematology and Blood banking:Human Blood Group Systems. Inheritance of blood group systems. Blood transfusion. 10 Hours

**SUGGESTED READINGS**

* Park, K. (2007), Preventive and Social Medicine, B.B. Publishers
* Godkar P.B. and Godkar D.P. Textbook of Medical Laboratory Technology, II Edition, Bhalani Publishing House
* Cheesbrough M., A Laboratory Manual for Rural Tropical Hospitals, A Basis for Training Courses
* Guyton A.C. and Hall J.E. Textbook of Medical Physiology.
* Robbins and Cortan, Pathologic Basis of Disease, VIIIEdition.
* Prakash, G. (2012), Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Co. Ltd.

**Cluster Elective Paper: VIII-A-3**

**CLINICAL MICROBIOLOGY**

Hours 60 Marks 60

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**UNIT – I: Introduction to Clinical Microbiology:** **10 Hours**

Introduction to microbiology. Introduction to bacteriology. Classification of bacteria. Basic features of bacteria. Factors influencing the growth of bacteria. Morphology of bacteria. Normal bacterial flora of the body. Pathogenic microorganisms.

**UNIT – II: Clinical Bacteriology Laboratory & Staining methods:** **15 Hours**

Requirements of a microbiological lab -– safe disposal strategies. Safetypractices to be followed in a microbiological laboratory. Sterilization and disinfection. Requirements in a microbiological lab. Microscopy. Automation in Bacteriology. Introduction to Staining. Gram Staining. Acid-Fast Staining. Capsule Staining. Transfer of bacteria.

**UNIT – III: Culturing of Microorganisms and Identification of Bacteria:** **15 Hours**

Composition of culture media. Different types of culture media. Preparation of culture media. Inoculation of culture media. Culturing of anaerobes and different types of culture media used. Use, preparation and quality control of various culture media. Identification of bacteria – staining reactions, cultural characteristics and biochemical properties. Study of Gram Negative Bacteria – Bacilli and Cocci. Study of Gram Positive Bacteria – Gram positive Cocci, Anaerobic bacteria, study of genus – Bacillus and Corynebacterium. Study of Mycobacteria, Spirocahetes and Rickettsia. Basic sterilization principles - autoclaving.

**UNIT- IV: Clinical Mycology and Virology:** **10 Hours**

Basic morphological classification of clinically important fungi. Parasitic fungi – Superficial Mycoses and Dermatophytes, Subcutaneous Mycoses, Intermediate Superficial Deep Mycoses and Deep or Systemic mycoses. Classification based on symptomatology. Some important viruses and related diseases (Measles viruses, Influenza viruses, Rotaviruses, PoliovirusesHerpes viruses, Rabies viruses, Hepatitis viruses. . General transmission routes for viruses.

**UNIT - V: Diagnostic Serology:** **10 Hours**

General view of immune system. Antibodies. Harmful effect of immunity. Autoimmune diseases. Principles of Serodiagnostic tests - Flocculation test, Agglutination test, Slide agglutination test, Tube agglutination test, Complement test, Micro titration test, Precipitin test and ELISA.

**SUGGESTED READINGS**

* Park, K. (2007), Preventive and Social Medicine, B.B. Publishers
* Godkar P.B. and Godkar D.P. Textbook of Medical Laboratory Technology, II Edition, Bhalani Publishing House
* Cheesbrough M., A Laboratory Manual for Rural Tropical Hospitals, A Basis for Training Courses
* Guyton A.C. and Hall J.E. Textbook of Medical Physiology.
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* Prakash, G. (2012), Lab Manual on Blood Analysis and Medical Diagnostics, S. Chand and Co. Ltd.

**ZOOLOGY PRACTICAL SYLLABUS**

**CLUSTER ELECTIVE –VIII-A: VI SEMESTER**

**MEDICAL DIAGNOSTICS**

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**PRACTICAL – 1 CLINICAL BIOCHEMISTRY**

* Collection of blood specimen and serum preparation.
* Blood glucose and urine glucose estimation.
* LFT, Kidney Function and Cardiac Profile tests.
* Determination of serum proteins, SGOT, SGPT, S.ALP, S.ACP
* Determination of sodium, potassium and chlorides

**PRACTICAL – 2 HAEMATOLOGY & CLINICAL MICROBIOLOGY**

* Routine haematological tests – Blood smear preparation, TC, DC, ESR, Platelet count.
* Determination of Haemoglobin.
* Determination of PCV.
* Determination of bleeding time.
* Determination of blood clotting time.
* Blood Grouping.
* Preparation of nutrient agar, culture plates and isolation of bacteria on nutrient agar plate.
* Study of permanent slides of *Candida albicans, Enterobacter sps, Pseudomonas, Salmonellasps, Shigella sps, Staphylococcusaureus*, *Streptococcus pyogenes* and *Vibrio cholera*.
* Staining methods – Albert’s and Gram’s staining methods.
* Hepatitis test and Pregnancy test using ELISA
* VDRL qualitative and quantitative test.
* WIDAL slide agglutination and tube agglutination test.

**PRACTICAL - III:PROJECT WORK**

Associated with a Clinical Diagnostic Laboratory.

